

Serial No.: 10/727,999
Group Art Unit: 2818

REMARKS

Election/Restriction

The Examiner acknowledged the Applicant's election with traverse of Group I (claims 13-20) drawn to a semiconductor device. Accordingly, claims 1-12 were withdrawn from consideration as being directed to a non-elected invention.

The Examiner stated, because the Applicant did not distinctly and specifically point out the supposed error in the restriction requirement, the election has been treated as an election without traverse and the Applicant has the right to file a divisional application covering the subject matter of the non-elected claims.

However, although the Applicant has elected claims 13-20, it is respectfully submitted for the record that the Restriction election was with traverse and without waiving any rights for reconsideration. Because the process of making and the product are not believed to be patentably distinct and because search and examination of the invention can be performed without "serious burden", it is still believed that the Restriction requirement was improper, and withdrawal thereof is respectfully requested.

Claim Rejections - 35 USC §102

Claims 13-20 are rejected under 35 U. S. C. § 102(e) as being anticipated by Dennard et al. (US 6,812,527, hereinafter "Dennard").

Dennard provides a method of forming a silicon-on-insulator ("SOI") metal oxide semiconductor field effect transistor device ("MOSFET") in which an implanted back-gate is formed into a Si-containing layer of an SOI wafer. The implanted back-gate is capable of controlling the threshold voltage of a polysilicon-containing front-gate that is formed over a portion of the implanted back-gate region. The implanted back-gate functions as a dynamic threshold voltage control system in the SOI MOSFET device.

Regarding claim 13, the Applicant respectfully traverses the rejection since the Applicant's claimed combination includes the limitation not disclosed in Dennard of:

"source/drain regions, beneath the silicide layers, that are enriched with dopant from the silicide layers"

Serial No.: 10/727,999
Group Art Unit: 2818

The Examiner states in the Office Action dated March 21, 2005:

"...Dennard discloses ... source/drain regions 50, beneath the silicide layers 56, that are enriched with dopant from the silicide layers ... (col. 3, cols 7-8, and figs. 1, 14, 15)."

However, Dennard, column 7, line 65 – column 8, line 26, states:

"After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional salicidation process..." [deletions for clarity]

Nothing is said about the effect, if any, upon the underlying source/drain regions, of the salicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard does not disclose source/drain regions beneath the silicide layers that are enriched with dopant from the silicide layers as claimed in claim 13.

It is therefore respectfully submitted that independent claim 13, and the respective claims 14-18 depending therefrom, are not anticipated by Dennard under 35 USC §102(e) because:

"Anticipation requires the disclosure in a single prior art reference disclosure of each and every element of the claim under consideration." *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing *Soundsciber Corp. v. United States*, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). *Carella v. Starlight Archery*, 804 F.2d 135, 138, 231 USPQ 644, 646 (Fed. Cir.), *modified on reh'g*, 1 USPQ 2d 1209 (Fed. Cir. 1986); *RCA Corp. v. Applied Digital Data Sys., Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

"While the Court erred (sic) in stating that *Moziek* [prior art] must, to anticipate, disclose the same invention as that described by *Kalman* [invention patent], it still found that one element of the claimed invention was not disclosed in *Moziek*, which was enough. . . We [CAFC] are unable to find clear error in the Court's decision that the KC [infringer] did not sustain its

Serial No.: 10/727,999
Group Art Unit: 2818

burden of demonstrating anticipation." *Kalman v. Kimberly-Clark Corp.*, 218 USPQ 781.

"If the reference fails to teach or suggest even one limitation of the claimed invention, then the claim is not anticipated." *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1574, 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984).

Withdrawal of the rejection is therefore respectfully requested.

Regarding claims 14, 15, and 16, these dependent claims each depend, directly or indirectly, from independent claim 13 and are believed to be allowable since they contain all the limitations set forth in independent claim 13 from which they depend and additionally claim non-obvious combinations thereof. Withdrawal of the rejection of claims 14, 15, and 16 is therefore respectfully requested because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

The Applicants also respectfully traverse the rejection of claim 16 since the Applicants' claimed combination includes the limitation not disclosed in *Dennard* of:

"a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers"

The Examiner states in the Office Action:

"a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers (col. 7, lines 65-67)"

However, *Dennard*, column 7, line 65 -67, states:

"After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process."

Thus, neither here nor elsewhere does *Dennard* refer to dopant profiles, nor disclose the steeper dopant profile of the present invention as claimed in claim 16. Withdrawal of the rejection is therefore respectfully requested on this ground as well because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

Serial No.: 10/727,999
Group Art Unit: 2818

Regarding claims 17-20, no explanation was provided for the rejection of these claims under 35 USC §102(e). The Applicant is therefore unable to address those rejections, except to say that those claims similarly fail to be anticipated by Dennard, *inter alia*, for the same reasons discussed above, and withdrawal of the rejection of those claims is therefore requested. Withdrawal of the rejections of claims 17-20 is additionally deemed appropriate in view of the lack of explanation for the rejections thereof.

Claim Rejections - 35 USC §103

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dennard et al. (US 6,812,527, hereinafter "Dennard") in view of Sitaram et al. (US 5,352,631, hereinafter "Sitaram"), and further in view of the remark [sic].

Dennard was previously summarized above.

Sitaram provides a process for forming transistor silicided regions. Various silicide and dopant materials are disclosed.

"Regarding claim 16, the Applicants respectfully traverse the rejection on the grounds that the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark since the Applicants' claimed combination includes the limitation not disclosed in either Dennard or Sitaram of:

"the source/drain regions that are enriched with dopant from the silicide layers have a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers"

The Examiner states in the Office Action dated March 21, 2005:

"Regarding to [sic] claim 16, Dennard discloses the claimed invention except for the device wherein the source/drain region are enriched with dopant from the silicide layers having a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device wherein the source/drain region are [sic] enriched with dopant from the silicide layers having a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers."

Serial No.: 10/727,999
Group Art Unit: 2818

However, Dennard, column 7, line 65 – column 8, line 26, states:

“After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional salicidation process...” [deletions for clarity]

Nothing is said or suggested in Dennard about the effect, if any, upon the underlying source/drain regions, of the salicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard neither discloses nor suggests source/drain regions beneath the silicide layers that are enriched with dopant from the silicide layers [and] have a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers as claimed in claim 16.

Thus, the Examiner, in the further remarks quoted above (second paragraph), has apparently acknowledged that Dennard does not teach this combination but has cited no reference showing or even suggesting such a combination. Since there is no disclosure, teaching, or suggestion in Dennard of the claimed limitation, if this basis of rejection is maintained the Applicants respectfully request an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2) (2002):

“When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons.”

Accordingly, and based upon the above, it is respectfully submitted that claim 16 is allowable under 35 U.S.C. §103(a) as being unobvious at the time the invention was made to a person having ordinary skill in the art because:

“[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the

Serial No.: 10/727,999
Group Art Unit: 2818

claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Accordingly, withdrawal of the rejection of claim 16 is respectfully requested.

Additionally, with respect to claim 16, this dependent claim depends from independent claim 13 and is believed to be allowable since it contains all the limitations set forth therein and additionally claims non-obvious combinations thereof. Withdrawal of the rejection of claim 16 is therefore respectfully requested on this ground as well because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

"Regarding claim 17, which depends from independent claim 13, the Applicants respectfully traverse the rejection on the grounds that the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark since the Applicants' claimed combination includes the limitation not disclosed in either Dennard or Sitaram of:

"source/drain regions, beneath the silicide layers, that are enriched with dopant from the silicide layers" (parent claim 13)

The Examiner states in the Office Action:

"Regarding to [sic] claim 17, Dennard discloses the claimed invention except for the device wherein the dopant is a material selected from a group consisting of arsenic, phosphorus, antimony, boron, indium, and a combination thereof. However, Sitaram teaches the dopant is a material selected from a group consisting of arsenic, phosphorus, antimony, boron, indium, and a combination thereof (col. 6, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the dopant that is a material selected from a group consisting of arsenic, phosphorus, antimony, boron, indium, and a combination thereof, as taught by Sitaram in order to prevent resistive contacts and interconnects that are not desirable for electrical circuits due to the fact that resistance limits maximum current flow, may create heat, and may result in reduced circuit accuracy, consistency, and performance (col. 1, lines 15-19)."

Serial No.: 10/727,999
Group Art Unit: 2818

However, Dennard, column 7, line 65 – column 8, line 26, states:

“After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional salicidation process...” [deletions for clarity]

Nothing is said or suggested in Dennard about the effect, if any, upon the underlying source/drain regions, of the salicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard neither discloses nor suggests source/drain regions beneath the silicide layers that are enriched with dopant from the silicide layers.

Thus, the Examiner, in the further remarks quoted above (second paragraph), has apparently acknowledged that Dennard does not teach this combination but has cited no reference showing or even suggesting such a combination. Since there is no disclosure, teaching, or suggestion in Dennard of the claimed limitation, if this basis of rejection is maintained the Applicants respectfully request an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2) (2002):

“When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons.”

Accordingly, and based upon the above, it is respectfully submitted that claim 17 is allowable under 35 U.S.C. §103(a) as being unobvious at the time the invention was made to a person having ordinary skill in the art because:

“[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be

Serial No.: 10/727,999
Group Art Unit: 2818

found in the prior art, and not based on applicant's disclosure." *In re Vaeck*,
947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Accordingly, withdrawal of the rejection of claim 17 is respectfully requested.

Additionally, with respect to claim 17, this dependent claim depends from independent claim 13 and is believed to be allowable since it contains all the limitations set forth therein and additionally claims non-obvious combinations thereof. Withdrawal of the rejection of claim 17 is therefore respectfully requested on this ground as well because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

"Regarding claim 18, which depends from independent claim 13, the Applicants respectfully traverse the rejection on the grounds that the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark since the Applicants' claimed combination includes the limitation not disclosed in either Dennard or Sitaram of:

"source/drain regions, beneath the silicide layers, that are enriched with dopant from the silicide layers" (parent claim 13)

The Examiner states in the Office Action:

"Regarding to [sic] claim 18, Dennard discloses the claimed invention except for the device wherein the silicide layers are a silicide of a metal selected from a group consisting of cobalt, nickel, titanium, hafnium, platinum, and a combination thereof. However, Sitaram teaches the silicide layers are a silicide of a metal selected from a group consisting of cobalt, nickel, titanium, hafnium, platinum, and a combination thereof (col. 1, lines 26-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the silicide layers that are a silicide of a metal selected from a group consisting of cobalt, nickel, titanium, hafnium, platinum, and a combination thereof, as taught by Sitaram in order to prevent resistive contacts and interconnects that are not desirable for electrical circuits due to the fact that resistance limits maximum current flow, may create heat, and may result in reduced circuit accuracy, consistency, and performance (col. 1, lines 15-19)."

Serial No.: 10/727,999
Group Art Unit: 2818

However, Dennard, column 7, line 65 – column 8, line 26, states:

“After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional salicidation process...” [deletions for clarity]

Nothing is said or suggested in Dennard about the effect, if any, upon the underlying source/drain regions, of the salicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard neither discloses nor suggests source/drain regions beneath the silicide layers that are enriched with dopant from the silicide layers.

Thus, the Examiner, in the further remarks quoted above (second paragraph), has apparently acknowledged that Dennard does not teach this combination but has cited no reference showing or even suggesting such a combination. Since there is no disclosure, teaching, or suggestion in Dennard of the claimed limitation, if this basis of rejection is maintained the Applicants respectfully request an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2) (2002):

“When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons.”

Accordingly, and based upon the above, it is respectfully submitted that claim 18 is allowable under 35 U.S.C. §103(a) as being unobvious at the time the invention was made to a person having ordinary skill in the art because:

“[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be

Serial No.: 10/727,999
Group Art Unit: 2818

found in the prior art, and not based on applicant's disclosure." *In re Vaack*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Accordingly, withdrawal of the rejection of claim 18 is respectfully requested.

Additionally, with respect to claim 18, this dependent claim depends from independent claim 13 and is believed to be allowable since it contains all the limitations set forth therein and additionally claims non-obvious combinations thereof. Withdrawal of the rejection of claim 18 is therefore respectfully requested on this ground as well because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

"Regarding claim 19, the Applicants respectfully traverse the rejection on the grounds that the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark since the Applicants' claimed combination includes the limitation not disclosed in either Dennard or Sitaram of:

"source/drain regions, beneath the silicide layers, that are enriched with dopant, from the silicide layers, that has a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers"

The Examiner states in the Office Action:

"... source/drain regions 50, beneath the silicide layers 56, that are enriched with dopant, from the silicide layers ... (cols 7-8 and figs. 1, 14, 15).

However, Dennard does not disclose the source/drain regions that has [sic] a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers ..." [deletions for clarity]

As previously pointed out above, Dennard, column 7, line 65 – column 8, line 26, states:

"After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional silicidation process..." [deletions for clarity]

Serial No.: 10/727,999
Group Art Unit: 2818

Nothing is said or suggested in Dennard about the effect, if any, upon the underlying source/drain regions, of the salicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard neither discloses nor suggests source/drain regions, beneath the silicide layers, that are enriched with dopant, from the silicide layers, that has a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers as claimed in claim 19.

Thus, the Examiner, in the further remarks quoted above (second paragraph), has apparently acknowledged that Dennard does not teach this combination but has cited no reference showing or even suggesting such a combination. Since there is no disclosure, teaching, or suggestion in Dennard of the claimed limitation, if this basis of rejection is maintained the Applicants respectfully request an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2) (2002):

"When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons."

Accordingly, and based upon the above, it is respectfully submitted that claim 19 is allowable under 35 U.S.C. §103(a) as being unobvious at the time the invention was made to a person having ordinary skill in the art because:

"[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaack*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Accordingly, withdrawal of the rejection of claim 19 is respectfully requested.

"Regarding claim 20, which depends from independent claim 19, the Applicants respectfully traverse the rejection on the grounds that the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark

Serial No.: 10/727,999
Group Art Unit: 2818

since the Applicants' claimed combination includes the limitation not disclosed in either Dennard or Sitaram of:

"source/drain regions, beneath the silicide layers, that are enriched with dopant, from the silicide layers, that has a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers" (parent claim 19)

The Examiner states in the Office Action:

"Regarding to [sic] claim 20, Dennard discloses the device wherein the silicide layers in the epitaxial silicon thickening layer further comprise silicide layers formed by thermal silicidation of deposited metallic layers into a dopant implanted epitaxial silicon thickening layer (col. 7, lines 1-5)."

However, Dennard, column 7, line 65 – column 8, line 26, states:

"After spacer formation, source/drain regions 50 are formed into body region 38 abutting each spacer utilizing a conventional ion implantation and annealing process ... Next, ... raised source/drain regions 52 ... are formed ... by depositing a layer of epi polysilicon or Si on the exposed source/drain regions, and doping the thus deposited epi Si or Si layer by ion implanting and annealing. ... Next, ... is [the step of] converting the raised source/drain regions ... into silicide regions 56 by utilizing a conventional silicidation process..." [deletions for clarity]

Nothing is said or suggested in Dennard about the effect, if any, upon the underlying source/drain regions, of the silicidation process on the raised source/drain regions. Thus, although Dennard discloses source/drain regions beneath the silicide layers, Dennard neither discloses nor suggests source/drain regions, beneath the silicide layers, that are enriched with dopant, from the silicide layers, that has a dopant profile that is steeper than the profile of dopant lacking enrichment from the silicide layers (parent claim 19).

These same issues have been discussed in detail above with respect to the rejection of claim 19, and those arguments are equally applicable to the rejection of claim 20. Consequently, the Applicants' claimed combination would not be unpatentable over Dennard in view of Sitaram and further in view of the remark. On those same bases, therefore, the Applicants respectfully traverse the rejection of claim 20.

Accordingly, withdrawal of the rejection of claim 20 is respectfully requested.

Additionally, with respect to claim 20, this dependent claim depends from independent claim 19 and is believed to be allowable since it contains all the limitations set

Serial No.: 10/727,999
Group Art Unit: 2818

forth therein and additionally claims non-obvious combinations thereof. Withdrawal of the rejection of claim 20 is therefore respectfully requested on this ground as well because of *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.* and the other cases cited therewith, *supra*.

Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 13-20 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 01-0365 and please credit any excess fees to such deposit account.

Respectfully submitted,



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